



1646
P#10

Atty. Docket No.: 2312/2082B

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Raghuram Kalluri
Serial No.: 10/032,221
Filed: December 21, 2001
Entitled: ANTI-ANGIOGENIC PROTEINS
AND FRAGMENTS AND
METHODS OF USE THEREOF

Examiner: Not Yet Assigned
Group Art Unit: 1646
Conf. No.: 3472

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8a

I hereby certify that this correspondence (and any paper or fee referred to as being enclosed) is being deposited with the United States Post Office as First Class Mail on the date indicated below in an envelope addressed to Commissioner for Patents, Washington, D.C. 20231.

Brenda M. Woods

Name of Person Mailing Paper

Brenda M. Woods

Signature of Person Mailing Paper

Commissioner for Patents
Washington, D.C. 20231

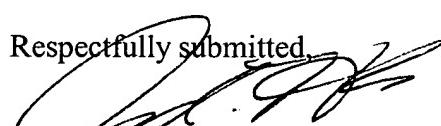
TRANSMITTAL LETTER

Enclosed for filing in the above-identified patent application, please find the following documents:

1. Information Disclosure Statement;
2. Form PTO-1449;
3. Copies of Cited References; and
4. Return Post Card.

The Commissioner for Patents is hereby authorized to charge any additional fees or credit any overpayment in the total fees to Deposit Account No. 16-0085, Reference No. 2312/2082B.
A duplicate of this transmittal letter is enclosed for accounting purposes.

Respectfully submitted,


Name: Joyce C. Hersh
Registration No.: 42,890
Palmer & Dodge LLP
111 Huntington Avenue
Boston, MA 02199-7613
Tel: 617-239-0100

RECEIVED

DEC 17 2002

TECH CENTER 1600/2900

Date: December 12, 2002



Atty. Docket No.: 2312/2082B PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Raghuram Kalluri
Serial No.: 10/032,221
Filed: December 21, 2001
Entitled: ANTI-ANGIOGENIC PROTEINS
AND FRAGMENTS AND
METHODS OF USE THEREOF

Examiner: Not Yet Assigned
Group Art Unit: 1646
Conf. No.: 3472

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8a

I hereby certify that this correspondence (and any paper or fee referred to as being enclosed) is being deposited with the United States Post Office as First Class Mail on the date indicated below in an envelope addressed to Commissioner for Patents, Washington, D.C. 20231.

Brenda M. Woods

Name of Person Mailing Paper

Brenda M. Woods

Signature of Person Mailing Paper

Commissioner for Patents
Washington, D.C. 20231

RECEIVED

DEC 17 2002

**INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR §§ 1.56, 1.97 AND 1.98**

TECH CENTER 1600/2900

Dear Sir:

In accordance with the duty of disclosure under 37 CFR § 1.56, Applicant submits this Information Disclosure Statement pursuant to 37 CFR §§ 1.97 and 1.98 in the above-identified application for consideration by the Patent Office. A listing of the cited documents is also enclosed, as well as, for the Examiner's convenience, copies of the documents in the list. Pursuant to CFR § 1.97(b)(3), because this Statement is being submitted before the first Office Action on the merits, no fee is required.

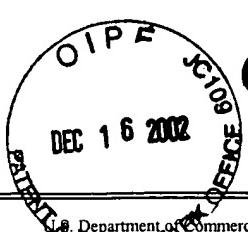
Applicant does not intend to represent that any of the documents submitted herein are material prior art to this invention or that the list represents an exhaustive search of documents related to this invention.

Applicant respectfully requests that the documents submitted herein be considered and made of record in this application.

Respectfully submitted,


Name: Joyce C. Hersh
Registration No.: 42,890
Palmer & Dodge LLP
111 Huntington Avenue
Boston, MA 02199-7613
Tel: 617-239-0100

Date: December 12, 2002



RECEIVED

Page 1 of 4

DEC 17 2002

TECH CENTER 1600/2900

USPTO Form 1449 Patent and Trademark Office	U.S. Department of Commerce PATENT AND TRADEMARK OFFICE	Attorney Docket No.	Serial No.
		2312/2082B	10/032,221
		Applicant(s): Raghuram Kalluri	
		Filing Date: December 21 2001	Group: 1646

U.S. PATENT DOCUMENTS

Examiner Initial		Patent No.	Date	Name	Class	Subclass	Filing Date (if appropriate)
	1.	5,114,840	19 May 1992	Tryggvason et al.	435	6	07 July 1989
	2.	5,424,408	13 Jun 1995	Reeders et al.	536	23.5	30 Nov 1990
	3.	5,567,609	22 Oct 1996	Sarras, Jr. et al.	435	240.2	30 June 1994
	4.	5,593,900	14 Jan 1997	Tryggvason et al.	436	547	11 Oct 1994
	5.	5,691,182	25 Nov 1997	Sarras, Jr. et al.	435	240.1	30 June 1995
	6.	5,731,192	24 Mar 1998	Reeders et al.	435	320.1	23 June 1995
	7.	5,753,230	19 May 1998	Brooks, et al.	424	158.1	18 Mar 1994
	8.	5,766,591	16 Jun 1998	Brooks, et al.	424	184.1	30 Dec 1994
	9.	5,856,184	05 Jan 1999	Sarras, Jr. et al.	435	363	18 Feb 1997
	10.	5,973,120	26 Oct 1999	Reeders et al.	530	356	07 Mar 1995
	11.	6,007,980	28 Dec 1999	Reeders et al.	435	4	07 Oct 1998
	12.	6,017,926	25 Jan 2000	Askew et al.	514	300	15 Dec 1998

FOREIGN PATENT DOCUMENTS

Examiner Initial		Document No.	Publication Date	Country	Class	Subclass	Translation	
							YES	NO
	13.	WO 89/03392	20 Apr 1989	PCT	C07K	7/08		
	14.	WO 91/08755	27 Jun 1991	PCT	A61K	37/02		
	15.	WO 91/09113	27 Jun 1991	PCT	C12N	5/00		
	16.	WO 96/00582	11 Jan 1996	PCT	A61K	38/39		
	17.	WO 97/06791	27 Feb 1997	PCT	A61K	31/12		
	18.	WO 97/45137	04 Dec 1997	PCT	A61K	38/48		
	19.	WO 99/02551	21 Jan 1999	PCT	C07K	7/64		
	20.	WO 99/16465	08 Apr 1999	PCT	A61K	39/00		
	21.	WO 99/49885	07 Oct 1999	PCT	A61K	38/39		
	22.	WO 99/65940	23 Dec 1999	PCT	C07K	14/47		
	23.	WO 00/11475	02 Mar 2000	PCT	G01N	33/564		
	24.	WO 00/31248	02 Jun 2000	PCT	C12N	15/00		
	25.	WO 00/59532	12 Oct 2000	PCT	A61K	38/39		

OTHER DOCUMENTS (including Author, Title, Date, Pertinent Pages, etc.)

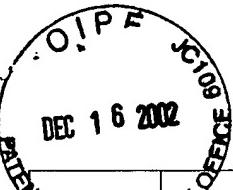
26.	Boudreau, N. et al., "Suppression of ICE and Apoptosis in Mammary Epithelial Cells by Extracellular Matrix," <i>Science</i> 267:891-893 (1995).
27.	Briesewitz, R. et al., "Expression of Native and Truncated Forms of the Human Integrin α_1 Subunit," <i>J. Biol. Chem.</i> 268(4):2989-2996 (1993).

RECEIVED

DEC 17 2002

Page 2 of 4

TECH CENTER 1600/2900

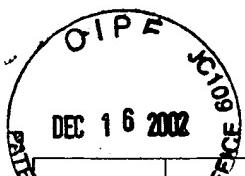


	28.	Brinker, J.M. et al., GenBank Acc. No. M11315, 01-Nov-94.
	29.	Brooks, P.C. et al., "Requirement of Vascular Integrin $\alpha_v\beta_3$ for Angiogenesis," <i>Science</i> 264: 569-571 (1994).
	30.	Butkowski, R.J. et al., "Properties of the Globular Domain of Type IV Collagen and Its Relationship to the Goodpasture Antigen," <i>J. Biol. Chem.</i> 260(6):3739-3747 (1985).
	31.	Chan, B.M.C. et al., "In Vitro and in Vivo Consequences of VLA-2 Expression on Rhabdomyosarcoma Cells," <i>Science</i> 251:1600-1602 (1991).
	32.	Colorado, P.C. et al., "Arresten: Angiogenesis and Renal Cell Carcinoma Tumor Inhibiting Matrix Protein", <i>J. Amer. Soc. Nephrol.</i> 10:489A (1999).
	33.	Colorado, P.C. et al., "Anti-Angiogenic Cues From Vascular Basement Membrane Collagen", <i>Cancer Res.</i> 60:2520-2526 (2000).
	34.	Dickeson, S.K. et al., "Determinants of Ligand Binding Specificity of the $\alpha_1\beta_1$ and $\alpha_2\beta_1$ Integrins," <i>J. Biol. Chem.</i> 274:32182-32191 (1999).
	35.	Fleischmajer, R. et al., "There Is Binding of Collagen IV to β_1 Integrin during Early Skin Basement Membrane Assembly," <i>Ann. N.Y. Acad. Sci.</i> 857:212-227 (1998).
	36.	Gehlsen, K.R. et al., "Subunit Structure of a Laminin-binding Integrin and Localization of Its Binding Site on Laminin," <i>J. Biol. Chem.</i> 264(32):19034-19038 (1989).
	37.	Gunwar, S. et al., "Properties of the Collagenous Domain of the α_3 (IV) Chain, the Goodpasture Antigen, of Lens Basement Membrane Collagen," <i>J. Biol. Chem.</i> 266(21):14088-14094 (1991).
	38.	Gunwar, S. et al., "Glomerular Basement Membrane," <i>J. Biol. Chem.</i> 273(15):8767-8775 (1998).
	39.	Han, J. et al., "A Cell Binding Domain from the α_3 Chain of Type IV Collagen Inhibits Proliferation of Melanoma Cells," <i>J. Biol. Chem.</i> 272(33):20395-20401 (1997).
	40.	Hostikka, S.L. and Tryggvason, K., "The Complete Primary Structure of the α_2 Chain of Human Type IV Collagen and Comparison with the α_1 (IV) Chain," <i>J. Biol. Chem.</i> 263(36):19488-19493 (1988).
	41.	Hynes, R.O., "Integrins: Versatility, Modulation, and Signaling in Cell Adhesion," <i>Cell</i> 69:11-25 (1992).
	42.	Ivaska, J. et al., "A Peptide Inhibiting the Collagen Binding Function of Integrin α_2 I Domain," <i>J. Biol. Chem.</i> 274(6):3513-3521 (1999).
	43.	Kalluri, R. and D. Cosgrove, "Assembly of Type IV Collagen," <i>J. Biol. Chem.</i> 275(17): 12719-12724 (2000).
	44.	Kalluri, R. et al., "The α_3 chain of type IV collagen induces autoimmune Goodpasture syndrome," <i>Proc. Natl. Acad. Sci. USA</i> 91:6201-6205 (1994).
	45.	Kalluri, R. et al., "The Goodpasture Autoantigen," <i>J. Biol. Chem.</i> 271(15):9062-9068 (1996).
	46.	Kalluri, R. et al., "Isoform Switching of Type IV Collagen Is Developmentally Arrested in X-Linked Alport Syndrome Leading to Increased Susceptibility of Renal Basement Membranes to Endoproteolysis," <i>J. Clin. Invest.</i> 99(10):2470-2478 (1997).
	47.	Kalluri, R. and V.P. Sukhatme, "Fibrosis and Angiogenesis", <i>Curr. Opin. Nephrol. Hypert.</i> 9:413-418 (2000).
	48.	Kalluri, R. et al., "Reactive Oxygen Species Expose Cryptic Epitopes Associated with Autoimmune Goodpasture Syndrome," <i>J. Biol. Chem.</i> 275(26): 20027-20032 (2000).
	49.	Kamphaus, G.D. et al., "Canstatin: A Novel Matrix Derived Inhibitor of Angiogenesis and Renal Cell Carcinoma Tumor Growth", <i>J. Amer. Soc. Nephrol.</i> 10:495A (1999).
	50.	Kamphaus, G.D. et al., "Canstatin, a Novel Matrix-derived Inhibitor of Angiogenesis and

RECEIVED

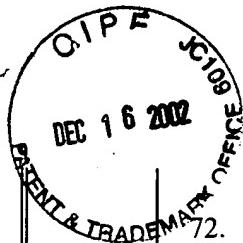
Page 3 of 4

DEC 17 2002



TECH CENTER 1600/2900

	Tumor Growth," <i>J. Biol. Chem.</i> 275(2):1209-1215 (1990).
51.	Kefalides, N.A. <i>et al.</i> , "Suppression of Tumor Cell Growth By Type IV Collagen and a Peptide From the NC1 Domain of the α_3 (IV) Chain", <i>Medicina</i> 59:553(1999).
52.	Kern, A. <i>et al.</i> , "The Role of the I Domain in Ligand Binding of the Human Integrin $\alpha_1\beta_1$ ", <i>J. Biol. Chem.</i> 269(36):22811-22816 (1994).
53.	Killen, P.D. <i>et al.</i> , GenBank Acc. No. M24766, 01-Nov-94.
54.	Kramer, R.H. and Marks, N., "Identification of Integrin Collagen Receptors on Human Melanoma Cells," <i>J. Biol. Chem.</i> 264(8):4684-4688 (1989).
55.	Langeveld, J.P.M. <i>et al.</i> , "Structural Heterogeneity of the Noncollagenous Domain of Basement Membrane Collagen," <i>J. Biol. Chem.</i> 263(21):10481-10488 (1988).
56.	Liotta, L.A., "Cancer Cell Invasion and Metastasis," <i>Scientific American</i> 54-64 (February 1992).
57.	Lochter, A. <i>et al.</i> , " α_1 and α_2 Integrins Mediate Invasive Activity of Mouse Mammary Carcinoma Cells through Regulation of Stromelysin-1 Expression," <i>Mol. Biol. Cell</i> 10:271-282 (1999).
58.	Maeshima, Y. <i>et al.</i> , "Two RGD-Independent $\alpha_1\beta_3$ Integrin Binding Sites on Tumstatin Regulate Distinct Anti-tumor Properties", <i>J. Biol. Chem.</i> 275(31):23745-23750 (2000).
59.	Maeshima, Y <i>et al.</i> , "Distinct Antitumor Properties of a Type IV Collagen Domain Derived from Basement Membrane", <i>J. Biol. Chem.</i> 275(28):21340-21348 (2000).
60.	Maeshima, Y. <i>et al.</i> , "Tumstatin, an Endothelial Cell-Specific Inhibitor of Protein Synthesis," <i>Science</i> 295: 140-143 (2002).
61.	Maragoudakis, M.E. <i>et al.</i> , "Basement membrane biosynthesis as a target for developing inhibitors of angiogenesis with anti-tumor properties," <i>Kidney International</i> 43:147-150 (1993).
62.	Mariyama, M. <i>et al.</i> , "The α_4 (IV) Chain of Basement Membrane Collagen," <i>J. Biol. Chem.</i> 267(2):1253-1258 (1992).
63.	Mariyama, M. <i>et al.</i> , "Colocalization of the Genes for the α_3 (IV) and α_4 (IV) Chains of Type IV Collagen to Chromosome 2 Bands q35-q37," <i>Genomics</i> 13:809-813 (1992).
64.	Mariyama, M. <i>et al.</i> , GenBank Acc. No. X80031, 05-Oct-98.
65.	Miles, A.J. <i>et al.</i> , "Promotion of Cell Adhesion by Single-stranded and Triple-helical Peptide Models of Basement Membrane Collagen α_1 (IV)531-543," <i>J. Biol. Chem.</i> 269(49):30939-30945 (1994).
66.	Miles, A.J. <i>et al.</i> , "A Peptide Model of Basement Membrane Collagen α_1 (IV) 531-543 Binds the $\alpha_3\beta_1$ Integrin," <i>J. Biol. Chem.</i> 270(49):29047-29050 (1995).
67.	Monboisse, J.C. <i>et al.</i> , "The α_3 Chain of Type IV Collagen Prevents Activation of Human Polymorphonuclear Leukocytes," <i>J. Biol. Chem.</i> 269(41):25475-25482 (1994).
68.	Mooney, A. <i>et al.</i> , "Type IV Collagen and Laminin Regulate Glomerular Mesangial Cell Susceptibility to Apoptosis Via β_1 Integrin-Mediated Survival Signals," <i>Amer. J. Pathol.</i> 155(2):599-606 (1999).
69.	Morrison, K.E. <i>et al.</i> , "Sequence and Localization of a Partial cDNA Encoding the Human α_3 Chain of Type IV Collagen," <i>Am. J. Hum. Genet.</i> 49:545-554 (1991).
70.	Neilson, E.G. <i>et al.</i> , "Specificity of Goodpasture Autoantibodies for the Recombinant Noncollagenous Domains of Human Type IV Collagen," <i>J. Biol. Chem.</i> 268(12):8402-8405 (1993).
71.	Nickols, A. <i>et al.</i> , "Antiangiogenic and anticancer Activities of Antagonists if Integrin $\alpha_1\beta_3$ ", <i>Proc. Ann. Mtg. Amer. Assoc. Cancer Res.</i> 38:206 (1997).



	Petitclerc, E. et al., "New Functions for Non-collagenous Domains of Human Collagen Type IV," <i>J. Biol. Chem.</i> 275(11):8051-8061 (2000).
73.	Prestayko, A.W. et al., "Type IV Collagen domains inhibit adhesion and migration of tumor cells and block angiogenesis," <i>Proceedings of the American Association for Cancer Research</i> 39:45 (March 1998).
74.	Prockop, D.J. and Kivirikko, K.I., "COLLAGENS: Molecular Biology, Diseases, and Potentials for Therapy," <i>Annu. Rev. Biochem.</i> 64:403-434 (1995).
75.	Quinones, S. et al., GenBank Acc. No. M92993, 23-Sep-94.
76.	Sado, Y. et al., "Induction of anti-GBM nephritis in rats by recombinant α_3 (IV)NC1 and α_4 (IV)NC1 of type IV collagen," <i>Kidney International</i> 53:664-671 (1998).
77.	Sarras Jr., M.P. et al., "Extracellular Matrix (Mesoglea) of <i>Hydra vulgaris</i> ," <i>Developmental Biology</i> 148:481-494 (1991).
78.	Saus, J. et al., "Identification of the Goodpasture Antigen as the α_3 (IV) Chain of Collagen IV," <i>J. Biol. Chem.</i> 283(26):13374-13380 (1988).
79.	Senger, D.R. et al., "Angiogenesis promoted by vascular endothelial growth factor: Regulation through $\alpha_1\beta_1$ and $\alpha_2\beta_1$ integrins," <i>Proc. Natl. Acad. Sci USA</i> 94:13612-13617 (1997).
80.	Shahan, T.A. et al., "Identification of CD47/Integrin-associated Protein and $\alpha_v\beta_3$ as Two Receptors for the α_3 (IV) Chain of Type IV Collagen on Tumor Cells," <i>Cancer Res.</i> 59:4584-4590 (1999).
81.	Timpl, R. et al., "A Network Model for the Organization of Type IV Collagen Molecules in Basement Membranes," <i>Eur. J. Biochem.</i> 120:203-211 (1981).
82.	Turner, N. et al., GenBank Acc. No. M81379, 30-Oct-94.
83.	Varner, J.A. et al., "Review: The Integrin $\alpha_v\beta_3$: Angiogenesis and Apoptosis," <i>Cell Adhesion and Communication</i> 3:367-374 (1995).
84.	Varner, J.A., "The role of vascular cell integrins $\alpha_v\beta_3$ and $\alpha_v\beta_5$ in angiogenesis", <i>Regulation of Angiogenesis</i> , Biurkhauser Verlag, Basel, Switzerland, 361-390 (1997).
85.	Vuorio, E. and de Crombrugghe, B., "The Family of Collagen Genes," <i>Annu. Rev. Biochem.</i> 59:837-872 (1990).
86.	Witkowski, C.M. and Kramer, J.M. "Site-Directed Mutations of Evolutionarily Conserved Sites on Type IV Collagen In <i>C. Elegans</i> ," Early 1997 International Worm Meeting Abstract 650 (1997).
87.	Zhou, J. et al., "Deletion of the Paired α_5 (IV) and α_6 (IV) Collagen Genes in Inherited Smooth Muscle Tumors," <i>Science</i> 261:1167-1169 (1993).

EXAMINER

DATE CONSIDERED

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

**Copies of references not provided at the time of this submission.

RECEIVED

DEC 17 2002

TECH CENTER 1600/2900